

Research, Vol. 306:575-578).

Although this rejection is respectfully traversed, claims 4 and 5 have been written in independent form simply in order to reduce the issues and expedite the prosecution of this application. In this regard, the Examiner's assistance in furthering the allowance of this case by examining separately the subject matter of Applicants' dependent claims is gratefully acknowledged.

In view of the above amendments and remarks, Applicants submit that all of the Examiner's concerns are now overcome and the claims are now in allowable condition. Accordingly, reconsideration and allowance of this application is earnestly solicited.

Claims 4-22 remain presented for continued prosecution.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,


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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. Cancelled.

2. Cancelled.

3. Cancelled.

4. (Amended) Δ [The] process [according to claim 3, wherein said DNA encoding] for producing N-acetylneuraminic acid which comprises:

providing in an aqueous medium (i) a culture of a microorganism having N-acetylneuraminic acid aldolase activity or N-acetylneuraminic acid synthetase activity, or a treated matter of the culture, (ii) a culture of a microorganism capable of producing pyruvic acid or a treated matter of the culture when a microorganism having N-acetylneuraminic acid aldolase activity is used in (i) above, or a culture of a microorganism capable of producing phosphoenolpyruvic acid or a treated matter of the culture when a microorganism having N-acetylneuraminic acid synthetase activity is used in (i) above, (iii) N-acetylmannosamine which is produced by allowing a culture of a microorganism harboring DNA encoding N-acetylglucosamine 2-epimerase [is DNA] derived from a microorganism belonging to the genus *Synechocystis*, or a treated matter of the culture and N-acetylglucosamine to be present in an aqueous medium to form and accumulate N-acetylmannosamine in the aqueous medium, and (iv) an energy source which is necessary for the formation of a pyruvic acid or phosphoenolpyruvic acid;

allowing N-acetylneuraminic acid to form and accumulate in the aqueous medium; and

recovering N-acetylneuraminic acid from the aqueous medium.

5. (Amended) A [The] process [according to claim 3 or 4], for producing N-acetylneuraminic acid which comprises:

providing in aqueous medium (i) a culture of a microorganism having N-acetylneuraminic acid aldolase activity or N-acetylneuraminic acid synthetase activity, or a treated matter of the culture, (ii) a culture of a microorganism capable of producing pyruvic acid or a treated matter of the culture when a microorganism having N-acetylneuraminic acid aldolase activity is used in (i) above, or a culture of a microorganism capable of producing phosphoenolpyruvic acid or a treated matter of the culture when a microorganism having N-acetylneuraminic acid synthetase activity is used in (i) above, (iii) N-acetylmannosamine which is produced by allowing a culture of a microorganism harboring DNA encoding N-acetylglucosamine 2-epimerase or a treated matter of the culture and N-acetylglucosamine to be present in an aqueous medium to form and accumulate N-acetylmannosamine in the aqueous medium, wherein said DNA encoding N-acetylglucosamine 2-epimerase is selected from the group consisting of: (a) DNA encoding a protein having the amino acid sequence shown in SEQ ID NO: 1; and (b) DNA having the nucleotide sequence shown in SEQ ID NO: 2, and (iv) an energy source which is necessary for the formation of pyruvic acid or phosphoenolpyruvic acid;

allowing N-acetylneuraminic acid to form and accumulate in the aqueous medium; and

recovering N-acetylneuraminic acid from the aqueous medium.

17. (Amended) A process for producing N-acetylneuraminic acid which comprises:

providing in an aqueous medium (i) a culture of a microorganism having N-acetylneuraminic acid adolase or a treated matter of the culture, (ii) a culture of a microorganism capable of producing pyruvic acid or a treated matter of the culture, (iii) N-acetylmannosamine produced by allowing a culture of a microorganism carrying DNA encoding N-acetylglucosamine 2-epimerase activity selected from the group consisting of (a) DNA encoding a protein having the amino acid sequence shown in SEQ ID NO: 1; and (b) DNA having the nucleotide sequence shown in SEQ ID NO: 2 or a treated matter of the culture and N-acetylglucosamine to be present in an aqueous medium to form and accumulate N-acetylmannosamine in the aqueous medium, and (iv) an energy source which is necessary for the formation of pyruvic acid;

allowing N-acetylneuraminic acid to form and accumulate in the aqueous medium; and

recovering N-acetylneuraminic acid from the aqueous medium.

18. (Amended) A process for producing N-acetylneuraminic acid which comprises:

providing in an aqueous medium (i) a culture of a microorganism having N-acetylneuraminic acid synthetase activity or a treated matter of the culture, (ii) a culture of a microorganism capable of producing phosphoenolpyruvic acid or a treated matter of the culture, (iii) N-acetylmannosamine produced by allowing a culture of a microorganism carrying DNA encoding N-acetylglucosamine 2-epimerase activity selected from the group consisting of (a) DNA encoding a protein having the amino acid sequence shown in SEQ ID NO: 1; and (b) DNA having the nucleotide sequence shown in SEQ ID NO: 2 or a treated matter of the culture and N-acetylglucosamine to be present in an aqueous medium to form and accumulate N-acetylmannosamine in the aqueous medium.

and (iv) an energy source which is necessary for the formation of phosphoenolpyruvic acid;
allowing N-acetylneuraminic acid to form and accumulate in the
aqueous medium; and
recovering N-acetylneuraminic acid from the aqueous medium.

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